California Department of Fish and Game Deer Management Program
http://www.dfg.ca.gov/hunting/deer/wasting.html

Introduction

Chronic Wasting Disease (CWD) is a fatal, contagious neurological disease that infects the brains of Rocky Mountain elk and North American deer. CWD has been diagnosed in wild deer and elk herds in portions of Colorado, Illinois, Nebraska, New Mexico, South Dakota, Utah, Wisconsin, and Wyoming. CWD was first recognized by biologists in the 1960s as a disease syndrome of captive deer held in wildlife research facilities in Ft. Collins, CO, but was not recognized as a transmissible spongiform encephalopathy (TSE) until 1978. CWD was subsequently recognized in captive deer, and later in captive elk, at other wildlife research facilities in Colorado (Ft. Collins, Kremmling, and Meeker) and Wyoming (Wheatland), as well as in at least two zoological collections. More recently, CWD has been diagnosed in privately-owned elk residing in game ranches in seven states (Colorado, Kansas, Minnesota, Montana, Nebraska, Oklahoma, and South Dakota) and two provinces (Saskatchewan and Alberta, Canada). In August 2002, CWD was diagnosed in a captive white-tailed deer on a hunting preserve in Wisconsin. Although CWD was first diagnosed in captive research cervids, the original source of CWD in either captive cervids or free-ranging cervids is unknown. There is no known relationship between CWD and any other TSE.

In 1999 the Department's Wildlife Investigations Lab (WIL) developed a CWD Surveillance Program and began sampling hunter-killed, road-killed and dead deer submitted to WIL for necropsy. Key Department personnel were trained to collect appropriate samples (brain stem, tonsils, and retropharyngeal lymph nodes) throughout the State. As of March 2004, more than 1307 tissue specimens have been collected and tested for CWD. All specimens have tested negative for CWD. The Department plans on continuing the CWD Surveillance Program indefinitely and will test approximately 500 deer annually. California is considered a "low risk" state for CWD since the ranching of cervids (except for fallow deer) is not allowed, importation of elk is not allowed (banned by the State legislature in the early 1980's), and the importation of any cervid is strictly limited. Fallow deer are not known to be susceptible at this point. Few deer have been imported into California during the past 20 years.

Hunting Out-Of-State

On June 16, 2003, the Fish and Game Commission adopted regulations restricting the importation of hunter-harvested deer and elk into California to replace the emergency regulations enacted in 2002. These emergency regulations were in effect immediately and lasted 120 days, allowing DFG time to develop permanent regulations. The emergency regulations allowed deer/elk carcasses to be transported into the State only if they were submitted to a certified meat processor within 72 hours of entry. Heads for taxidermy were allowed into the State if the heads were submitted to a taxidermist within 72 hours of entry. The meat processor and the taxidermist processing hunter-

harvested deer and elk from out-of-state had to dispose of unused tissues, brain and spinal column in a landfill approved for carcass or undergo incineration.

The new regulations eliminated the 72 hour grace period and do not allow the importation of any brain or spinal column tissue. Other body parts allowed by the proposed regulations include: Quarters and other portions of meat with no spinal column or head attached; hides with no heads attached; clean skull plates with antlers attached; antlers only; finished taxidermy heads; and upper canine teeth.

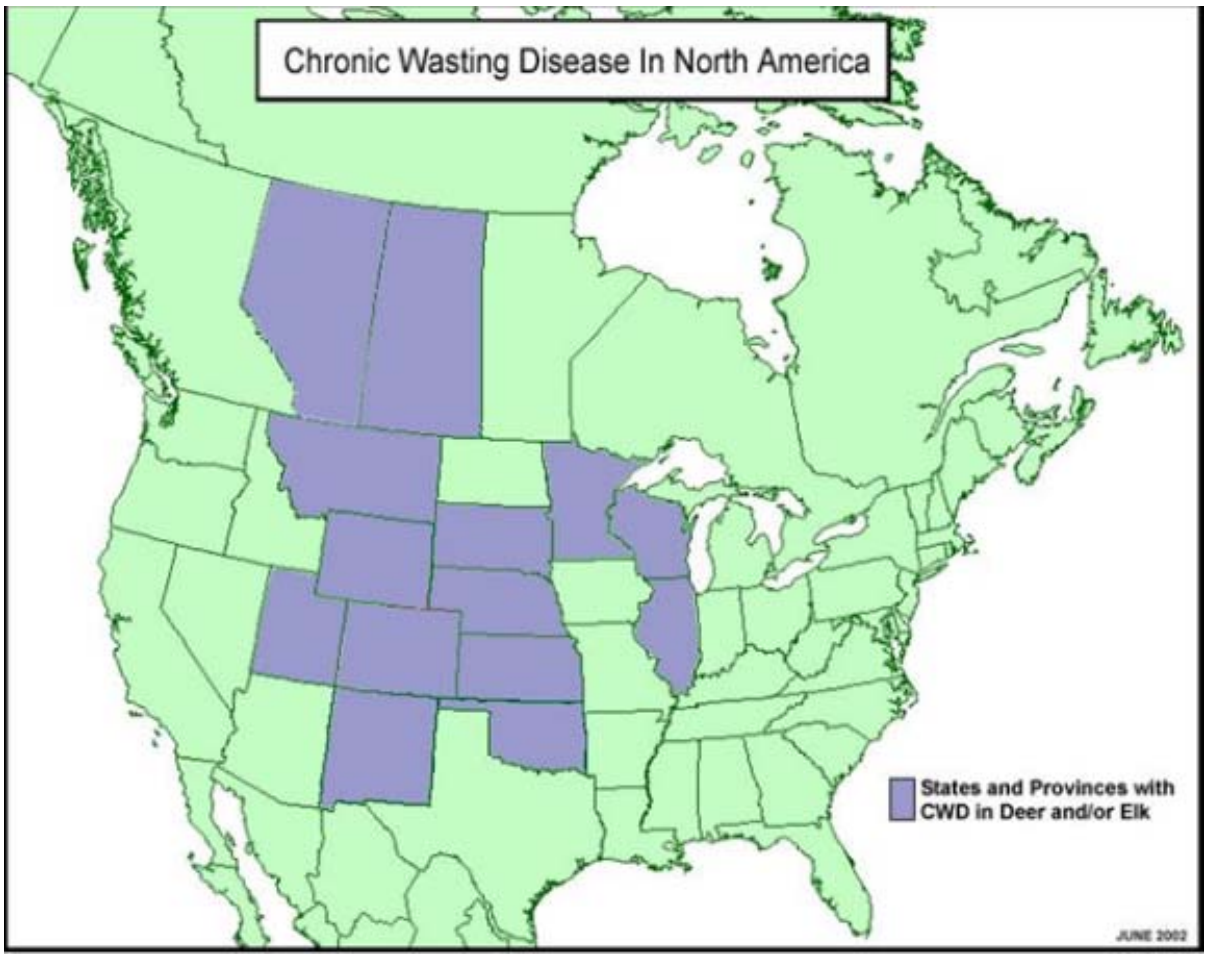
This regulation is necessary to minimize the risk of transport of the CWD prion into California. There is a theoretical risk that CWD could be transported into California in a CWD-infected carcass, and due to improper disposal of infected body parts (brain, spinal cord and lymph nodes), could potentially expose our native free-ranging deer/elk to the disease. No infectivity has been detected in skeletal muscle tissue, therefore, removal of nervous and lymphatic tissue from meat should remove the prion from an infected carcass.

Where Does CWD Occur?

CWD is relatively uncommon, and its geographic distribution is limited to portions of twelve states and two provinces. Based on data from a combination of surveillance methods, CWD now appears in free-ranging deer and elk in northern Colorado, southern Wyoming, western Nebraska, southwestern South Dakota, western Saskatchewan (Canada), southern Wisconsin, south-central New Mexico, northern Illinois, and eastern and central Utah. Although the disease doesn't appear to be common, the number of cases detected has increased in recent years. This trend may be explained by increased vigilance by wildlife and animal health officials, the captive cervid industry, and the public in reporting cases, but it may also reflect increased disease occurrence.

In addition to cases in captive research and free-ranging deer and elk, CWD has been diagnosed at various times in privately-owned, captive elk in Colorado, Minnesota, Montana, Nebraska, Oklahoma, South Dakota, Kansas, Alberta (Canada) and Saskatchewan (Canada) since 1996. CWD infection has been particularly severe in a group of interconnected facilities near Rapid City, South Dakota, that appear to be the original source of infection for other South Dakota game farms as well as the Saskatchewan epidemic. In contrast, infected elk in two of three Nebraska farms originated in Colorado, and infected elk in Oklahoma apparently originated in Montana; CWD has been confirmed in the Montana and Colorado source herds. Epidemiology of the Canadian cases has been under study, and South Dakota appears to be the likely source of CWD in Saskatchewan; it also appears that CWD was imported into Canada prior to 1990, and has spread among at least 18 farms via live animal sales over the last decade. The overall distribution and occurrence of CWD among farmed elk operations should become clearer as industry-wide surveillance programs are developed. There are no apparent epidemiological connections between the Colorado-Nebraska, South Dakota-Saskatchewan, and Montana-Oklahoma foci; moreover. The source of infection

for free-ranging white-tailed deer in Wisconsin is unknown. CWD at a farmed elk operation in Minnesota was confirmed on 30 August 2002.



The following is a brief chronology of CWD:

"CWD was first described clinically as a wasting syndrome in captive deer housed at Colorado research facilities in 1967. A few years later it was described in a Wyoming research facility.

"CWD was first determined to be a TSE in 1978 by Dr. Elizabeth Williams of the University of Wyoming.

"The first cases of CWD in wild deer and elk were diagnosed in 1981 in Colorado and 1985 in Wyoming.

"Beginning in the 1980s, the distribution of CWD in wild deer and elk in Colorado and Wyoming was determined through surveillance, and an endemic area for CWD in wild deer/elk was described (northeastern Colorado and southeastern Wyoming); in 2001, discovery of a positive wild mule deer in neighboring Kimball County, NE, extended the endemic area into southwestern Nebraska.

"From 1996 to December 2002, CWD was diagnosed in farmed elk herds in Colorado, Kansas, Minnesota, Montana, Nebraska, Okalahoma, South Dakota, and the Canadian Provinces of Alberta and Saskatchewan, and in a farmed white-tailed deer herd in Wisconsin.

"From 2000 to March 2003, CWD has been found in wild deer in northwestern Nebraska, southern New Mexico, southwestern South Dakota, northeastern Utah, southern Wisconsin, northwestern Colorado, northern Illinois, and the Canadian Province of Saskatchewan.

How is CWD Transmitted?

Neither the disease agent causing CWD nor its mode of transmission have been definitively identified, but clinical disease is associated with the accumulation of protease-resistant prion protein (PrPres) in brain tissue (as in other transmissible spongiform encephalopathies). Prions are infectious proteins lacking any significant nucleic acids. Evidence suggests infected deer and elk transmit the disease agent laterally through animal-to-animal contact and/or contamination of feed or water sources with saliva, urine, and/or feces. CWD seems more likely to occur in areas where deer or elk are crowded or where they congregate at man-made feed and water stations. Although CWD does not appear to be transmitted via contaminated feed, artificial feeding of deer and elk may compound the problem. This may in part explain the intensity of infection in some cervid populations housed in farm or research settings.

According to public health (Centers for Disease Control, World Health Organization) and animal health officials, data available to date indicate that CWD is not currently known to be naturally transmitted to humans, or to animals other than deer and elk. Data from recent molecular studies provide quantitative evidence of the apparent inefficiency of cross-species transmission. As a general precaution, however, public health officials recommend that people avoid contact with deer, elk, or any other wild animal that appears sick. Although there’s no evidence that CWD can be naturally transmitted to domestic livestock, CWD is similar in some respects to two livestock diseases: scrapie, which affects domestic sheep and goats worldwide and has been recognized for over 200 years, and bovine spongiform encephalopathy (BSE), which is a more recent disease of cattle in the United Kingdom and Europe. Despite some similarities, there is no evidence suggesting either scrapie or BSE are caused by contact with wild deer or elk, or that wild deer or elk can contract either scrapie or BSE in countries where these diseases occur.

Clinical Signs

Deer and elk affected with CWD show progressive loss of body condition accompanied by behavioral changes. In the later stages of disease, emaciation, excessive salivation, increased drinking and urination, stumbling, trembling, grinding of teeth, drooping of head and ears, and depression may be observed prior to death. As with other TSEs, the

clinical course of CWD appears to be progressive and irreversible, ultimately leading to the death of affected animals. Because the clinical signs of CWD disease are relatively nonspecific, laboratory examination of clinical suspects is essential for confirming this diagnosis.

Diagnosis of CWD

At present, the diagnosis of CWD is based on microscopic examination of brain (specifically, the medulla oblongata at the obex), retropharyngeal lymph nodes and tonsil tissues from suspected cases. Both histopathologic examination and immunohistochemistry (IHC) are used in routine diagnosis of clinical cases, and may also be used to detect preclinical cases in surveillance and monitoring programs. Of these, IHC appears to offer greater sensitivity in detecting early preclinical cases. Western blots and negative-stain electron microscopy have also been used to further confirm diagnoses, and other diagnostic tests are being evaluated. There are currently no validated live-animal tests for diagnosing either clinical or preclinical CWD in either deer or elk; however, research is underway to evaluate several promising avenues for ante mortem diagnosis.

Regulations

§712. Restriction of Importation of Hunter-Harvested Deer and Elk Carcasses.
No hunter harvested deer or elk (cervid) carcass or parts of cervid carcass shall be imported into the State, except for the following body parts:
(a) boned-out meat and commercially processed cuts of meat.
(b) portions of meat with no part of the spinal column or head attached.
(c) hides with no heads attached.
(d) clean skull plates (no meat or tissue attached) with antlers attached.
(e) antlers with no meat or tissue attached.
(f) finished taxidermy heads.
(g) upper canine teeth (buglers, whistlers, ivories).

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A more complete bibliography for CWD-related information can be found at: http://www.nwhc.usgs.gov/research/chronic_wasting/CWD_bib.html